National Institute of Environmental Health Sciences

Establishment and persistence of common ragweed (Ambrosia artemisiifolia L.) in disturbed soil as a function of an urban-rural macro-environment

Author(s): Ziska LH, George K, Frenz DA
Year: 2007
Journal: Global Change Biology. 13 (1): 266-274

Abstract:

No data are available on whether rising carbon dioxide concentration [CO2] or increased air temperature can alter the establishment and persistence of common ragweed (Ambrosia artemisiifolia L.) within a plant community following soil disturbance. To determine ragweed longevity, we exposed disturbed soil with a common seed bank population to an in situ temperature and [CO2] gradient along an urban–rural transect beginning in early 2002. No other consistent differences in meteorological variables (e.g. wind speed, humidity, PAR, tropospheric ozone) as a function of urbanization were documented over the course of the study (2002–2005). Above-ground measurements of biomass over this period demonstrated that ragweed along the transect responded to urban induced increases in [CO2]/temperature with peak biomass being observed at this location by the end of 2003. However, by the Fall of 2004, and continuing through 2005, urban ragweed populations had dwindled to a few plants. The temporal decline in ragweed populations was not associated with increased disease, herbivory or auto-allelopathy, but was part of a demographic reduction in the total number of annual plant species observed for the urban location. In a separate experiment, we showed that such a demographic shift is consistent with CO2/temperature induced increases in biomass and litter accumulation, with a subsequent reduction in germination/survival of annual plant species. Overall, these data indicate that [CO2]/temperature differences associated with urbanization may increase initial ragweed productivity and pollen production, but suggest that long-term, multi-year persistence of ragweed in the urban macro-environment may be dependent on other factors.

Source: Ask your librarian to help locate this item.

Resource Description

Exposure : ☑

weather or climate related pathway by which climate change affects health

Air Pollution, Meteorological Factors, Meteorological Factors, Temperature

Air Pollution: Allergens, Ozone

Geographic Feature: ☑

resource focuses on specific type of geography

Rural, Urban

Geographic Location: ☑

resource focuses on specific location

Global or Unspecified

Health Impact:

specification of health effect or disease related to climate change exposure

Respiratory Effect

Respiratory Effect: Upper Respiratory Allergy

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content